American University
W A S H I N G T O N , D C

Info-Metrics Institute

Fall 2024 Workshop:

Information, Value, Modeling, and Inference

**Thursday and Friday, September 12-13, 2024
at American University in Washington DC**

Program

DAY 1
Thursday, September 12
(Location: *School of International Services, T7*)

8:30-9:25AM: **Registration - Coffee - Refreshments** *(Light Breakfast)*

9:30-9:40AM: **Welcoming Remarks**
Professor Linda Aldoory, Dean, College of Arts and Sciences, American University

9:40-10:00AM: **Conference Opener/Objectives**
Amos Golan (American University)
Min Chen (University of Oxford, UK)

10:00-11:10 AM: **SESSION I: Maximum Entropy, Bayes, and Value**
Chair: Bowen Garrett (Urban Institute)

1. The Value of Information in the Age of Machine Learning
   Radu Victor Balan (University of Maryland)
2. A Unified Approach to Entropic and Bayesian Inference Methods
   Ariel Caticha (The State University of New York at Albany)
3. Bayesian Inference and the Principle of Maximum Entropy
   Duncan Foley (New School for Social Research) and Ellis Scharfenaker

11:10-11:20AM: **Coffee Break**

11:20AM-12:10PM: SESSION II: Maximum Entropy and Value
Chair: Amos Golan

Maximal Entropy: The Value of Information
Raphael Levine (The Hebrew University of Jerusalem, Jerusalem)

12:10-1:00PM: **Lunch Break** *(Provided)*

1:00-2:30PM: **SESSION III: Information Theory and Data Science**
Organizer: Min Chen (University of Oxford, UK)
Chair: Min Chen (University of Oxford, UK)

1. The Value of Human Knowledge in Data Science
   David Ebert (University of Oklahoma, USA)
2. Information-Theoretic Visual Analysis for Convolutional Neural Networks
   Han-Wei Shen (The Ohio State University, USA)
3. Revisiting Majority and First Stochastic Order: Generalized Entropies and Generalized Means
   Mateu Sbert (University of Girona, Spain)
4. Comparing Information Theory and Other Mathematical Frameworks for Underpinning Data Science in Terms of Its Narrow and Broad Definitions
   Min Chen (University of Oxford, UK)

2:30-3:40PM: **SESSION IV: Social Science Applications of Info-Metrics**
Chair: Tinatin Mumladze (American University)

1. Information, Interaction, and Groupwise Generative Heterogeneity: Key Results and Applications to Complex Socioeconomic Systems
   Paulo dos Santos (The New School for Social Research)
2. Hierarchical Maximum Entropy Model for Estimating the Global Technological Frontier
   Jangho Yang (University of Waterloo)
3. Relative Size Distribution of Business Firms - A QRSE Approach
   Doguhan Sundal (California State University)

3:40-4:00PM: **Coffee Break**

4:00-5:10PM:	**SESSION V: Info-Metrics and Applied Econometrics**
Chair: Marine Carrasco (University of Montreal)

1. Comparing Aggregation Methods in Ill-Conditioned Large-Scale Regression
Ana Silva, Tiago Freitas, **Maria Costa** (University of Aveiro, Aveiro, Portugal),
Rui Costa, Pedro Macedo
2. A Two-Stage Maximum Entropy Approach for Time Series Regression
Pedro Macedo (University of Aveiro, Portugal)
3. Maximum Entropy Approaches to Expectile Regression for Multinomial
Response Data
Collin S. Philipps (United States Air Force Academy), Adam Ackerman

5:10-6:20 PM:	**INFO-METRICS ROUND TABLE I: Potential Value of Information and Data**
Moderator: Ariel Caticha (The State University of New York at Albany)

1. Raphael Levine (The Hebrew University of Jerusalem, Jerusalem)
2. Min Chen (University of Oxford, UK)
3. Radu Balan (U. Maryland, College Park)
4. Amos Golan (American University)

6:30–8:00PM:	**RECEPTION** (*Butler Pavilion Board Room 600*)

DAY 2
Friday, September 13
(Location: *School of International Services, T7*)

8:00-9:00AM:	**Coffee-Refreshments** *(Light Breakfast)*

9:00-9:30AM:	**SESSION VI: Information Theory and Intelligence**
Chair: Pedro Macedo (University of Aveiro, Portugal)

Information-Theoretic Foundations of the Elements of Intelligence
Christoph Adami (Michigan State University)

9:30-10:30AM:	**SESSION VII: Info-Metrics and Applied Econometrics and Statistics**
Chair: Maria Costa (University of Aveiro, Aveiro, Portugal)

1. Sufficient Statistical Measures of Intergenerational Mobility
Steven Durlauf, **Esfandiar Maasoumi** (Emory University), Le Wang
2. Partial Least-Squares for Instrumental Variable Estimation with Many
Instruments
Marine Carrasco (University of Montreal), Saraswata Chaudhuri

10:30-11:20 AM: **SESSION VIII: Reinforcement Learning and the Value of Information**
Chair: Min Chen (University of Oxford, UK)

Resolving the Exploration-Exploitation Dilemma in RL using the Value of Information
Jose C. Principe (University of Florida)

11:20-11:35AM: **Coffee Break**

11:35-12:35PM: **SESSION IX: Short Presentations – Information, Decisions and Economics**
Chair: Essie Maasoumi (Emory University)

1. Information-theoretical analysis of data-driven decision workflows
   Philip Beaucamp (University of Oxford), Harvey Maylor, Min Chen
2. Statistical mechanics of income in peripheral capitalism: Peru, 2004-2022
   Cesar J. Castillo-Garcia (Wesleyan University)
3. U.S. racial stratification through the lens of utility burdens: An indices of informational association analysis of complex systems
   Kurt Semm, The New School for Social Research
4. Bayesian Inference and Confounding Variables with Limited Information
   Duncan K. Foley and **Ellis Scharfenaker**

12:35PM-1:20PM: **INFO-METRICS ROUND TABLE II: Future of Information Theory for Modeling and Inference**
Moderator: Amos Golan (American University)

1. Duncan Foley (New School for Social Research)
2. Jose Principe (University of Florida)
3. Ariel Caticha (The State University of New York at Albany)
4. Essie Maasoumi (Emory)

1:20-1:30PM: **Concluding Remarks**

1:30PM: **Lunch** *(Provided)*

End of Workshop